DOCUMENT RESUME

ED 362 912 CS 508 346

AUTHOR Wanta, Wayne; Roark, Virginia
TITLE Cognitive and Affective Responses to Newspaper Photographs.
PUB DATE Aug 93
NOTE 41p.; Paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (76th, Kansas City, MO, August 11-14, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Affective Behavior; Communication Research; High Schools; High School Students; *Information Sources; *Newspapers; *Photographs; *Recall (Psychology); Visual Aids
IDENTIFIERS Cognitive Response Analysis; Illinois; Visual Journalism

ABSTRACT

A study examined readers' cognitive and affective responses to photographs and accompanying stories published in 20 newspapers. Subjects, 204 high school students (mostly 18-year-old seniors) in 9 Illinois high schools, each read the front page of one of the 20 newspapers (chosen from across the country) and completed a quiz dealing with information contained in the stories. High school students were used because they are representative of the average newspaper reader in median years of school completed (12.7) and in heterogeneity and variety of backgrounds. Results indicated that readers have a limited capacity for storing information. Photographs that do not complement stories can detract from information processing of unrelated stories. Secondary stories especially suffer if something else is more memorable--such as an emotional photograph. Photographs also can have an affective influence, in which subjects underestimate future events based on photographs and accompanying stories. (Six tables of data are included; 27 references and 9 photographs from the front pages of the newspapers are attached.) (Author/RS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 362 912

Cognitive and Affective Responses to Newspaper Photographs

By Wayne Wanta
School of Journalism and Communication
University of Oregon
Eugene, OR 97403-1275
(503) 346-3742

and Virginia Roark
Department of Mass Communication
Southeast Missouri State University
Cape Girardeau, MO 63701
(314) 651-2241

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

W. Wanta

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

**Top-three faculty paper presented to the Visual Communication Division at the Association for Education in Journalism and Mass Communication annual conference, Kansas City, August 1993

**Wanta is an assistant professor in the School of Journalism and Communication at the University of Oregon, and Roark teaches in the Department of Mass Communication at Southeast Missouri State University.

CS508346

BEST COPY AVAILABLE

Cognitive and Affective Responses to Newspaper Photographs

Abstract

Readers' cognitive and affective responses to photographs and accompanying stories published in 20 newspapers were examined. Findings suggest that readers have a limited capacity for storing information. Photographs that do not complement stories can detract from information processing of unrelated stories. Secondary stories especially suffer if something else is worth remembering -- such as an emotional photograph. Photographs also can have an affective influence, in which subjects underestimate future events based on photographs and accompanying stories.

Cognitive and Affective Responses to Newspaper Photographs

The use of photographs is an important consideration to newspaper editors. Photos are the first element readers look at on a newspaper page, providing an "entry point" for readers (Garcia, 1987). Photographs also can lure readers to an accompanying story (Bain, 1980), and provide typographical relief by breaking up the grayness of story texts. Thus, photographs enjoy high readership (Stone, 1987)

The role of photographs in the overall packaging of the news, however, remains unclear. Garcia (1987) links visual processing of newspaper pages to B.F. Skinner. According to Garcia, Skinner argues that people like to visually connect dots. Readers, therefore, naturally try to connect visual elements. Garcia believes readers normally first look at largest photo on a newspaper page, then look at second largest, then third largest, etc. Based on this notion of eye movement, then, newspaper page designers largely adhere to "dominant art" designs, in which editors provide readers with one clear entry point to the page -- the largest photo.

But the significance of these eye movement studies is suspect: Is it significant what people look at first, second, third, or is it more important <u>how</u> people look at the page? In other words, the present study argues that how readers process the information provided on a newspaper page is a more important concern than what readers look at on the page and the order in which they view elements.

Thus, if the purpose of newspapers is to transmit information to their readers, researchers need to examine ways of increasing the efficiency of newspapers to do this function. Readers will not return to papers that do not transmit information efficiently.

One element that might influence the efficiency of newspapers is the dominant or lead photograph. If people first look at the largest photo on a page, perhaps certain types of photographs help or inhibit mental processing of information. In other words, photographs could have a cognitive influence on readers. Thus, photographs might have other effects much more important than merely influencing the eye movement of readers.

The photos also may put readers in certain moods, which may affect how they process information in story texts. A negative photo, for example, may put readers in a negative mood. They may then feel that stories on the page are more negative than the information in the stories would indicate. In other words, photographs could have an affective influence on readers, changing readers' opinions regarding their perceptions of the impact of accompanying stories.

This study attempts to examine cognitive and affective responses to newspaper photographs by investigating the ability to recall information and to predict future events of 204 subjects who read one of 20 different newspaper pages published on January 10, 1991.

All newspapers included in the study ran the same lead story -- a failed meeting between U.S. Secretary of State James Baker and Iraqi Foreign Minister Tarik Aziz to avert war in the Persian Gulf. But accompanying photographs varied greatly, from President Bush shaking his fist in anger, to a soldier praying, to Baker and Aziz shaking hands. It is believed that photographs will affect the ability of subjects to process information contained in related stories and will influence how they predict future events would turn out.

Theoretical framework

Newspaper photographs that accompany stories could have two important influences on readers. Two research questions address these influences.

First, do photographs enhance or inhibit readers' ability to recall information contained on the newspaper page? Photos may have a cognitive influence, affecting the reader's ability to process and recall information. In the case of the present study, readers viewing certain photographs run with accompanying stories of an impending Persian Gulf war may have differing levels of success recalling information about the war or information about other stories on the page.

Second, do photographs affect readers' predictions of future events? Photos may have an affective influence, influencing the readers' emotional response to stories on the page. In the case of the present study, readers viewing certain photographs run with accompanying stories of an

impending Persian Gulf war may over-estimate or under-estimate U.S. casualties and prisoners and the length of an upcoming war.

Researchers generally have devoted less attention to photographs than to other newspaper content, despite the fact that photos are among the most highly regarded elements in newspapers (see Stone, 1987). A few studies, however, have examined cognitive and affective responses to photographs.

Cognitive response research: Studies examining the effects of photographs on knowledge acquisition and memory have produced mixed findings. Three possibilities for the effects of photos exist.

* 1. A photo may call attention to both itself and an accompanying story. Therefore, a reader might read a story with more interest and thus remember more of what he/she has read because of an accompanying photograph.

Baxter, Quarles and Kosak (1978) support this argument. They concluded that pictures lend interest to stories, captions and headlines, and thus complement rather than conflict with accompanying material. In addition, they found that large photographs draw more attention than small ones. A large photograph was associated with increased knowledge of information that was in the headline and caption.

Rarick (1967), however, reported that, regardless of size, pictures related to a story draw more attention to the associated story. Swanson (1955) also found that newspaper

photographs increased readership of the accompanying story. In addition, visuals can also improve recall of television news stories (Son, Reese and Davie, 1987).

* 2. A photo may be a distraction, calling attention to itself and away from a news story. Thus, a reader may remember the photograph but not much of the story, since humans have a limited capacity for storing information.

Kerrick (1959) found some support for this argument. He reported that pictures with a caption were given different interpretation than the pictures or the captions alone, indicating a conflict of information.

Willows (1978) also reported that pictures can distract and decrease reading comprehension. This study may not be generalizable to newspaper readers, however, because the subjects in the study were grade-school children.

The type of photograph also may inhibit knowledge recall. Photographs high in emotion, for example, may detract from information processing. Mackie and Worth (1989) found that subjects in a high positive mood were unable to remember as much information as subjects in a neutral mood. Thus, if a photograph were to put readers in a high positive mood, the positive mood could cause mental processing space to be taken up. Though the experiment by Mackie and Worth looked at positive mood, it is likely that negative mood would produce the same effect. Thus, highly emotional photographs may lead to a decrease in processing of other information.

* 3. A photo may have no effect on information processing. Individuals may have enough memory storage that they can process and recall vast amounts of information from both visuals and accompanying texts.

Previous research also has supported this third possibility. Cohen (1973), for example, found that individuals have an ability to store vast amounts of detailed visual information, while Nickerson (1968) concludes that individuals have high long-term memory for pictorial material. Since visual information is easily processed and recalled, it may not conflict with verbal information.

Affective response research: Photographs may influence how readers predict future events might be affected by today's news. Photos depict the news visually, which may put the news in a certain light depending upon the elements in the photos. Photos and other visual elements also have high recall (Cohen, 1973; Nickerson, 1968). Therefore, if photos can be remembered, and if they put news in perspective, readers might predict future events differently for newspaper pages that contain different photographs.

A number of studies have found that readers' affective responses can differ for different types of photographs.

Wanta (1988), for example, found photographs can enhance the news media's agenda-setting effect on readers. Large photos caused accompanying stories to be significantly more salient than stories accompanied by smaller photos.

Furthermore, the smaller photo condition generated a significantly higher salience than no photo.

Emotion appears to be an important variable influencing how individuals process visual information. Culbertson (1974a) found that photographs rated highly sensational portrayed emotion through posture, action and physical context. He reported that highly emotional photographs caused subjects to interpret an article that gave both the pros and cons of an issue to be more pro.

Culbertson (1974b) also found that, on the whole, pictures were rated more emotional than verbal descriptions. This would indicate that photographs are likely to be the most emotional part of a news page.

Halliday-Levy (1982) found that photographs rated high in affective power contained strong non-verbal messages, such as conspicuous facial expressions, gestures or posturing.

Mitchell and Olson (1977) found that photographs can affect beliefs and attitudes about an advertised product. A photograph that complemented the verbal text increased belief, while non-complementary photographs did not. Some photographs produced a positive attitude toward the product, whether or not they affected beliefs about the product. Thus, photographs can produce a purely emotional response from the viewer, which may affect his or her attitudes and/or beliefs about accompanying verbal texts.

Pictures also generate elaborated mental imagery (Paivio, 1971, 1973; Rossiter, 1982), which in turn can cause

individuals to overestimate conjunctive probabilities -- or the likelihood that two events will occur together. In other words, mental imagery will cause individuals to overestimate the likelihood that a scenario they have imagined will actually take place as imagined. Thus, in the present study, readers may assess outcomes of future events in the Persian Gulf based on their affective responses to photographs. They may overestimate the likelihood of their imagined outcome to take place. Therefore, if they get visual cues of American superiority, they may overestimate the likelihood of a short war with few casualties and prisoners. On the other hand, if they get visual cues of American vulnerability, they may overestimate the likelihood of a long war with many casualties and prisoners.

Method

* Subjects: A total of 204 high school students in nine Illinois high schools participated. The students were mostly 18-year-old seniors and came from a variety of classes, including English, Civics and Government.

High school students were used for a number of reasons. First, these individuals are representative of the average newspaper reader on a number of important demographic variables. Since the median years of school completed by U.S. citizens is 12.7 (Kominski, 1991), using college students who are above the U.S. education median could bias the results.

The high school students are also very heterogeneous and come from a wide variety of backgrounds. Thus, the use of high school students should add to the validity of the results. Enrollments at the participating high schools range from 1,276 to 85.

* Treatments: Each subject read one of 20 newspapers from across the country that were collected for use in the study. The newspapers were selected based on two criteria. First, some newspapers were selected because they received a large number of awards for page designs, as determined by the Society of Newspaper Design (Society of Newspaper Design, 1990). These newspapers, then, were rated highly because of their visual excellence. Second, some newspapers were selected because they were judged as one of the top newspapers in the country (see Merrill, Lee and Friedlander, 1990; and Editor & Publisher, 1983). These newspapers, then, have reputations for overall excellence.

Editors from the 17 newspapers that were unavailable through a university library were contacted and asked to provide newspapers dated January 4 through 11, 1990, for use in a publications design class. The present study grew out of this class.

It should be noted that only one newspaper -- the Dallas Morning News -- declined to provide copies of its paper. The New York Times and Washington Post were not included in the study because of a distribution problem. Table 1 lists

the 20 newspapers used in the study and their respective circulations.

The January 10, 1991, edition of each newspaper was used in the study. The selection of January 10 was purposive: the topic of the lead story was the same in each case (the failed meeting between U.S. Secretary of State James Baker and Iraqi Foreign Minister Tariq Aziz to avert war in the Persian Gulf), but the presentation of the lead story and other stories on the pages varied greatly. For example, some newspapers used an accompanying picture of President Bush shaking his fist. Some used a picture of Baker and Aziz shaking hands. Others used a picture of a soldier praying. Still others used only mugshots. Thus, though the stories across newspapers were very similar, the types of photographs accompanying the stories were very different, an important consideration for the present study.

In addition, some newspapers ran more than one story dealing with the Gulf crisis. Others ran stories dealing with such diverse topics as gang murders and high school girls' use of chewing tobacco.

Treatments, then, were actual newspaper pages that had been read earlier by thousands of readers. The pages were not altered in any way.

Subjects were instructed to read the front page of the newspapers for 30 minutes, then answer a quiz dealing with information contained in the stories. All questions were

short answer, since educators have criticized multiple-choice tests as being inaccurate measures of a student's knowledge.

* Time frame: The study was conducted in April and May of 1991, or a few months after the Gulf War and three to four months after the newspapers were published.

* Dependent variables: To examine subjects' information recall, two indexes were formed. Subjects were asked four questions dealing with the lead story or stories -- the failed meeting between Baker and Aziz and reaction to the meeting. Subjects also were asked three questions dealing with stories other than on the war. The indexes, then, measured subjects' ability to recall information about the lead story or stories and other secondary stories.

On these knowledge recall questions, subjects were given zero to two points for each answer. If they answered a question correctly, they received a score of two. If they were within 10 percent of quantitative questions or if they were within a week of a correct date, they received a score of one. If they missed a question by more than 10 percent or by more than a week, or if they failed to answer the question, they received a score of zero.

For example, a question dealing with a story in the Atlanta Journal asked "Approximately how many Americans are killed each year by passive smoke?" The correct answer of 53,000 received a score of "2." An incorrect answer between 47,700 and 58,300 received a score of "1." An answer below

47,700 or above 58,300, or if the subject failed to answer the question at all, resulted in a score of "0."

Scores on the questions were then summed to produce two "information recall" indexes. Since each newspaper in the study contained some stories unique to that paper, a different quiz was written for each page. In other words, 20 quizzes were written -- one for each of the 20 newspapers in the study.

Three individual items measured respondents' expectations of the upcoming war. Subjects were instructed to "Base your answers for the next three questions solely on the stories you read in the newspaper provided to you." Subjects were then asked "How many casualties would you expect U.S. troops to suffer in a war with Iraq?," "How long would you expect a war with Iraq to last?" and "How many U.S. troops would you expect to be taken as prisoners of war?"

To avoid problems that could arise from wild predictions skewing results, the variance was restricted for each of the three estimates. Scores were grouped on a scale of 1 to 10, based on percentages of responses to each of the three questions.

Independent variables: All 20 newspapers were then grouped according to the lead photo each used. The photos are included in an appendix. All photos fell into one of nine categories:

1. A soldier praying. This photograph is a highly emotional photograph that personalized the war by showing a

likely front-line participant with his hand folded and head bowed. Five newspapers used this photo: The Detroit Free Press, Boston Globe, Miami Herald, Atlanta Journal and Chicago Tribune.

2. President Bush at a press conference shaking his fist in anger. This photograph shows strong facial emotion, and is directly related to the lead story of the day -- the failed meeting to avert war. Four newspapers used this photo: The Atlanta Constitution, Des Moines Register, St. Petersburg Times and Norfolk Ledger-Star.

3. U.S. Secretary of State James Baker shaking hands with Iraqi Foreign Minister Tariq Aziz. This photograph shows little emotion, but does show an attempt at cooperation between the two sides. Three newspapers used this photo: The Philadelphia Inquirer, Baltimore Sun and Washington Times.

4. Only mugshots of various officials. Again, the photos show little emotion, but are directly related to the lead story. Two newspapers used only mugshots: The Los Angeles Times and Louisville Courier Journal.

5. A Vietnam veteran in a wheelchair giving a "peace sign." The photo probably would produce different opinions for different readers, since it depicts a war protester. Many of the subjects in the present study -- high school students -- were extremely supportive of U.S. involvement in the Persian Gulf. Only the Milwaukee Journal used this photo.

6. A child on his father's shoulders waving an American flag. This photograph did not accompany a story and was not

tied in with the lead story. It referred to a story on an inside page, which subjects did not read. Only the St. Louis Post-Dispatch used this photo.

7. President Bush with a very somber facial expression. This photograph had high facial emotion, showing a very concerned president. Two newspapers used this photo: The San Francisco Examiner and Seattle Times.

8. President Bush, expressionless, standing behind a lectern at a news conference. This photograph had very low emotion, but was related to the lead story. Only the San Jose Mercury News used this photo.

9. A jet. This photograph shows U.S. superiority, by depicting the "largest aircraft in the non-communist world." Only the Syracuse Herald-Journal used this photo.

Statistical analysis: A series of one-way analysis of variance tests examined if subjects who received treatments with one specific photograph differed from other subjects on both the cognitive and affective measures. Duncan's multiple range test was used to identify differences between treatment groups. The Duncan test is a moderately powerful test of differences between group means, less stringent than Scheffe's test but more conservative than the least-significant difference test (Edwards, 1985, p. 132)

Limitations: Two potential shortcoming of the study should be noted.

First, some of the students may have been avid readers of stories dealing with the Gulf crisis, and thus may have been able to recall information about the war without reading the treatments. However, randomization of subjects into treatment groups should have lessened this problem.

Second, verbal information may have had a strong impact on information recall. Indeed, some of the newspapers included in the study used several Gulf crisis stories on their front pages. The different verbal coverage of the Gulf crisis, then, could have influenced the findings. However, the knowledge recall questions dealt with information specifically included in the lead stories. The lead story was the same in all 20 newspapers -- the failed meeting between Baker and Aziz.

Results

All tests produced statistically significant ANOVA F-scores.

Table 2 shows the results of the one-way ANOVA examining subjects' knowledge recall of information contained in the Persian Gulf stories. Subjects who received newspaper pages displaying a photo of the child waving a flag or a photo of President Bush in a somber expression recalled Persian Gulf information better than three other groups: the Vietnam veteran, the jet and the soldier praying. The ANOVA F-score was 6.68 ($p = .000$)

Table 3 details the results of the one-way ANOVA examining subjects' knowledge recall of information contained

in stories dealing with topics other than the Persian Gulf. Subjects who received newspaper pages displaying a photo of the soldier praying did significantly worse than all but one other group. The ANOVA F-score was 2.08 (p =.039)

The affective analyses tests produced an extremely consistent pattern.

Table 4 lists the results of the one-way ANOVA examining subjects' estimates of the number of U.S. casualties. Subjects who received newspaper pages displaying the Army jet had significantly lower casualty estimates than four other groups. Subjects who read newspapers with the photo of the child waving a U.S. flag also predicted lower casualties than the subjects who read newspapers with the photo of President Bush at a lectern. The ANOVA F-score was 2.02 (p =.049)

Table 5 shows the results of the one-way ANOVA examining subjects' estimates of the length of a war with Iraq. As with the previous analysis, subjects who received newspaper pages displaying the Army jet had significantly lower estimates of the length of a war than other groups -- in this case, seven of the eight other groups. Subjects who read newspapers with the photo of the Vietnam veteran also predicted a shorter war than the subjects who read newspapers with the photo of Baker and Aziz shaking hands. The ANOVA F-score was 2.99 (p =.004)

Finally, Table 6 details the results of the one-way ANOVA examining subjects' estimates of potential U.S. prisoners. Again, subjects who received newspaper pages

displaying the Army jet had significantly lower estimates of the number of prisoners than other groups -- and their estimates differed significantly from all other groups. None of the other groups differed from each other. The ANOVA F-score was 2.06 (p =.043)

Discussion

This study examined readers' cognitive and affective responses to photographs and accompanying stories published in 20 different newspapers. Subjects were asked knowledge recall questions to test cognitive response differences between treatment groups, while subjects were asked to predict future events to test affective response differences. Statistically significant differences were found across all cognitive and affective measures.

Cognitive processing: Knowledge recall

The tests of knowledge recall showed that different photos are related to different knowledge acquisition. The results of these cognitive tests, however, are difficult to explain.

As Table 2 shows, subjects who received newspaper pages displaying a photo of the child waving a flag or a photo of President Bush with a somber expression recalled Persian Gulf information better than three other groups: those who received pages with photographs of a Vietnam veteran, a jet or a soldier praying. One explanation is especially plausible.

The two photos producing the lowest knowledge recall (Vietnam veteran and jet) were associated with stories related to the war, but not directly connected with the newspapers' major news story -- the failed meeting between Baker and Aziz. Therefore, these two photographs did not complement the major story, but conflicted with it by depicting somewhat unrelated events. Readers may have had problems connecting the visuals with the verbal story texts and thus were less likely to recall information contained in the main stories. Readers, then, may have received conflicting messages from the lead story and accompanying photographs, which caused confusion and thus produced less accurate processing of information contained in the main story.

Furthermore, the photograph of the Vietnam veteran was not likely to be very emotional to a group of high school students -- the subjects here -- who have no memory of the Vietnam war. Thus, the reduced processing did not come from emotional impact, but simply from conflicting visual and verbal messages.

Besides the three photographs that produced the lowest levels of knowledge recall, only one other photograph in the study did not depict events directly related to the lead story -- the failed meeting to avert war. This photograph, showing a child sitting on his father's shoulder and waving a flag, however, likely did not generate much imagery in the subjects. A flag is a very concrete symbol. Because

concrete information is easier to process than abstract information (Booher, 1975), the flag photograph did not take up much processing space within subjects. Thus, subjects were able to process the photograph and information in the lead story efficiently.

The photograph of President Bush in a somber mood, meanwhile, showed high emotion and drew attention to the accompanying story -- in this case, the lead story regarding the failed meeting to avert war. Thus, readers were drawn to the lead story, read deeper into the story and were able to recall information contained in the story efficiently.

As Table 3 shows, subjects in the group that saw one photo -- depicting a soldier praying -- also did much worse than any other group on recall of information on non-Persian Gulf stories. This was arguably the most emotional of the nine photographs used by the newspapers in the study and thus generated a great deal of imagery. It also contained a very conspicuous non-verbal gesture (praying), which Halliday-Levy (1982) argues produces the strongest affective power. Thus, this photograph distracted readers from information contained in secondary stories on the page -- those stories that did not pertain to the Gulf crisis -- while also distracting readers from information contained in the lead story, to a lesser degree.

Overall, the findings here suggest that readers have a limited capacity for storing information. Photographs that do not complement stories can detract from information

processing of unrelated stories. Secondary stories especially suffer if there is something else on the page worth remembering -- such as an emotional photograph. In the case here, the emotional photograph of a soldier praying distracted subjects from other information on the page. The photo was especially memorable because of its emotional content. Therefore, subjects devoted memory storage to the photograph, and thus devoted less memory storage to information contained in secondary stories on the page.

Based on the results, then, photographs may serve to enhance or diminish reading comprehension on the newspaper page. A photograph can focus attention on an accompanying story -- as in the case of the photo of President Bush in a somber mood -- or away from unrelated stories -- as in the case of the soldier praying.

Affective responses: Estimates of the war

The affective responses to photographs on the newspapers' front pages are clear and consistent across all three measures. As Tables 4, 5 and 6 show, subjects reading a newspaper that contained a picture of a U.S. jet were likely to underestimate the number of U.S. casualties and prisoners and the length of an impending war. Two plausible reasons could explain this result.

First, the jet showed preparedness. Other newspapers ran stories about U.S. preparedness, but this was the only photo that depicted this preparedness. Booher (1975) found that pictures are better than words in communicating

information about concrete objects and events (such as the soldiers who might be involved in a war). Words are clearer in meaning than pictures and are essential in representation of abstract concepts. Since the jet visually showed that the U.S. soldiers were prepared for war -- a concrete event -- readers understood the consequences, and thus lowered their estimates of the negative events that could occur.

Second, the photo drew attention to an accompanying story. While other pages ran stories dealing with preparedness, none ran a photo to draw attention to these stories. This supports one conclusion of Baxter, Quarles and Kosak (1978), who found that photos complement, rather than compete with, associated news content. The jet photo explained what the accompanying news story was stating: that the United States was prepared for war. Thus, since readers were drawn to the story and read deeper into the story, they were able to recall details regarding U.S. preparedness, and therefore stated lower estimates of the future war. In other words, the photo and story combined to convey a strong message of American superiority.

The picture of the jet, moreover, may have prompted a stronger visual image about preparedness for war than the other stories on preparedness. According to Kahneman and Tversky (1982), imagizing causes people to look at a situation as a whole instead of its individual parts. This causes individuals to predict a situation will turn out as they have imagined it. In the present case, then, the

picture of the jet, along with the accompanying story, may have given subjects a more positive view of American preparedness for war.

This result is also consistent with the findings of Carroll (1978) about likelihood assessment. The jet photo should have brought images of power and successful fighting to the reader. This imagery would have caused the subjects to overestimate the likelihood of the scenario of a successful and short war, caused by the superiority of the United States as symbolized by the jet.

Implications

The findings here offer a number of practical implications for photographers and/or editors responsible for the selection of photographs.

First, editors should select photographs that depict events and consequences of events for accompanying stories. While photographs can enhance information processing by drawing readers to an accompanying story, photos marginally related to stories detract from information processing. If photos are marginally related to an accompanying story, they may cause confusion by providing non-complementary messages.

Second, emotional photographs should be selected with care. While an emotional photograph may draw readers to accompanying stories, they also detract from other stories on the page. If photos are highly emotional and highly personalized, they may detract from secondary stories on the

25

page. Readers may devote significant memory storage to he memorable photograph and thus devote less memory storage to information contained in secondary, less important stories. Thus, the advantages of luring readers into one story should be weighed against the disadvantages of distracting readers from the rest of the stories on the page.

Third, since the findings suggest that attitudes about future events can be influenced by visuals, editors and photographs should realize that their photo selections could color the perceived impact of news stories. The findings here suggest visuals can significantly alter readers' perceptions of the future consequences of the news.

It is somewhat unclear, however, the precise affective role that photographs play. In the present study, the photo depicting U.S. superiority may have caused readers to underestimate the negative events that could occur in a Gulf war. On the other hand, the photos could have played a secondary role, by merely luring readers to more closely read an accompanying story dealing with U.S. preparedness. Thus, examining the precise role photos play in this process appears to be a fruitful area for future research.

Table 1. Newspapers included in the study.

Newspaper	Circulation
1. Atlanta Constitution	316,793
2. Atlanta Journal	191,811
3. Baltimore Sun	343,609
4. Boston Globe	521,354
5. Chicago Tribune	721,067
6. Des Moines Register	207,126
7. Detroit Free Press	636,182
8. Norfolk (Va.) Ledger-Star	77,655
9. Los Angeles Times	1,196,323
10. Louisville Courier Journal	233,714
11. Miami Herald	428,931
12. Milwaukee Journal	265,461
13. Philadelphia Inquirer	519,895
14. St. Louis Post-Dispatch	382,381
15. St. Petersburg Times	353,130
16. San Francisco Examiner	136,346
17. San Jose Mercury News	278,676
18. Seattle Times	233,995
19. Syracuse Herald-Journal	93,449
20. Washington Times	97,188

Table 2. Knowledge of information contained in stories dealing with the Persian Gulf crisis.

Mean	Photo	Significantly different means 5 9 1 3 2 8 4 6 7
.64	5. Vietnam vet	
.73	9. Jet	
.89	1. Soldier praying	
.91	3. Baker-Aziz shaking hands	
.98	2. Bush shaking fist	
1.05	8. Bush at lectern	
1.08	4. Mugshots	
1.25	6. Child with flag	* * *
1.35	7. Somber Bush	* * *

Analysis of Variance F-score: 6.68 (p =.000)

Note: "*" denotes treatments that produced significantly different mean scores.

Table 3. Knowledge of information contained in stories other than those dealing with the Persian Gulf crisis.

		Significantly different means 1 2 3 4 5 6 7 8 9
Mean	Photo	
.52	1. Soldier praying	
.94	2. Bush shaking fist	*
1.06	8. Bush at lectern	
1.12	9. Jet	*
1.18	7. Somber Bush	*
1.21	4. Mugshots	*
1.31	3. Baker-Aziz shaking hands	*
1.37	5. Vietnam vet	*
1.38	6. Child with flag	*

Analysis of Variance F-score: 2.08 (p =.039)

Note: "*" denotes treatments that produced significantly different mean scores.

Table 4. Estimates of number of U.S. casualties.

		Significantly different means							
		9	6	7	2	4	1	3	8	5
Mean	Photo									
2.13	9. Jet									
3.44	6. Child with flag									
4.33	7. Somber Bush									
4.53	2. Bush shaking fist									
4.69	4. Mugshots									
5.08	1. Soldier praying	*								
5.18	3. Baker-Aziz shaking hands	*								
5.75	8. Bush at lectern	*								
6.33	5. Vietnam vet	*	*							

Analysis of Variance F-score: 2.02 (p =.049)

Note: "*" denotes treatments that produced significantly different mean scores.

Table 5. Estimates of length of war.

		Significantly different means								
		9	5	6	1	8	2	7	4	3
Mean	Photo									
1.33	9. Jet									
3.09	5. Vietnam vet									
4.22	6. Child with flag		*							
4.95	1. Soldier praying		*							
5.00	8. Bush at lectern		*							
5.22	2. Bush shaking fist		*							
5.22	7. Somber Bush		*							
5.31	4. Mugshots		*							
5.87	3. Baker-Aziz shaking hands		*							*

Analysis of Variance F-score: 2.99 (p =.004)

Note: "*" denotes treatments that produced significantly different mean scores.

Table 6. Estimates of U.S. prisoners of war.

		Significantly different means								
		9	4	8	1	2	5	3	6	7
Mean	Photo									
1.40	9. Jet									
4.24	4. Mugshots		*							
4.25	8. Bush at lectern		*							
4.85	1. Soldier praying		*							
4.87	2. Bush shaking fist		*							
4.90	5. Vietnam vet		*							
5.04	3. Baker-Aziz shaking hands		*							
5.06	6. Child with flag		*							
6.33	7. Somber Bush		*							

Analysis of Variance F-score: 2.06 (p =.043)

Note: "*" denotes treatments that produced significantly different mean scores.

References

Chic Bain (1980), "Newspaper Design and Newspaper Readership: A Series of Four Experiments," Center for News Communications Research Report 10, School of Journalism, Indiana University, Bloomington.

William S. Baxter, Rebecca Quarles and Hermann Kosak (1978), "The Effects of Photographs and Their Size on Reading and Recall of News Stories," ERIC Document Reproduction Service No. 159-722.

J. Carroll (1978), "The Effect of Imagining an Event on Expectations for the Event: An Interpretation in Terms of the Availability Heuristic," Journal of Experimental Social Psycholology, 14:88-96.

G. Cohen (1973), "How Are Pictures Registered in Memory?," Quarterly Journal of Experimental Psychology, 25:557-564.

H. Culbertson (1974a), "Visual Detail, Sensationalism and Perceived Writer Stand," Journalism Quarterly, 51:79-86.

H. Culbertson (1974b), "Words vs. Pictures: Perceived Impact and Connotative Meaning," Journalism Quarterly, 51:226-237.

Editor & Publisher (1983), "Best in the USA: Top 15 Dailies picked by 610 news leaders," June 11, p. 11).

Allen L. Edwards (1985), Experimental Design in Psychological Research, 5th edition, New York: Harper & Row Publishers.

Mario R. Garcia (1987), Contemporary Newspaper Design: A Structural Approach, 2nd edition (Englewood Cliffs, NJ: Prentice Hall).

Tereza Halliday-Levy (1982), "The Connotative Dimension of News Photographs," ERIC Document Reproduction Service No. 217-475.

D.R. Kahneman and A. Tversky (1982), "The Simulation Heuristic, in D.R. Kahneman, P. Slovic and A. Tversky (eds.), Judgments Under Uncertainty: Heuristics and Biases. New York: Cambridge University Press, pp. 201-208.

J.S. Kerrick (1959), "News Pictures, Captions and Point of Resolution," Journalism Quarterly, 36:183-188.

Robert Kominski (1991), "Current Population Reports: Population Characteristics," Department of Commerce Series P-20, No. 451 (August).

D.M. Mackie and L.T. Worth (1989), "Processing Deficits and the Mediation of Positive Affect in Persuasion," Journal of Personality and Social Psychology, 57:27-40.

John C. Merril, John Lee and Edward Jay Friedlander (1990), Modern Mass Media (New York: Harper & Row Publishers).

A.A. Mitchell and J.C. Olson (1977), "Cognitive Effects of Advertising Repetition," in W.D. Perrault (ed.), Advances in Consumer Research, Vol. IV. Atlanta: Association for Consumer Research.

Raymond S. Nickerson (1968), "A Note on Long-Term Recognition Memory for Pictorial Material," Psychonomic Science, 11:58.

A. Paivio (1971), Imagery and Verbal Processes. New York: Holt, Rinehart & Winston.

A. Paivio (1973), "Picture Superiority in Free Recall: Imagery or Dual Coding?," Cognitive Psychology, 5:176-206.

Galen Rarick (1967), "Field Experiments in Newspaper Item Readership," unpublished manuscript, University of Oregon, Division of Communication Research.

J. Rossiter (1982), "Visual Imagery: Applications to Advertising, in A.A. Mitchell (ed.), Advances in Consumer Research. Ann Arbor, MI: Association for Consumer Research, pp. 621-629.

Society of Newspaper Design (1990), The Best of Newspaper Design, 11th edition (Washington: Society of Newspaper Design)

Jinok Son, Stephen D. Reese, and William R. Davie, "Effects of Visual-Verbal Redundancy and Recaps on Television News Learning," Journal of Broadcasting and Electronic Media, 31:207-216.

Gerald Stone (1987), Examining Newspapers: What Research Reveals About America's Newspapers (Newbury Park, Calif: Sage Publications.

C.E. Swanson (1955), "What They Read in 130 Daily Newspapers," Journalism Quarterly, 32:411-442.

Wayne Wanta (1988), "The Effects of Dominant Photographs: An Agenda-Setting Experiment," Journalism Quarterly, 65:107-111.

Dale M. Willows (1978), "A Picture Is Not Always Worth a Thousand Words: Pictures as Distractors in Reading," Journal of Educational Psychology, 70:255-262.

Appendix. Photographs used by newspapers in the study.

AP PHOTO

US soldiers stationed in Saudi Arabia react to a television report on yesterday's talks in Geneva.

Photo #1: Soldier praying

BEST COPY AVAILABLE

The Associated Press

President Bush clenches his fist in determination at a news conference Wednesday as he vows to oust Iraq from Kuwait.

Photo #2: President Bush shaking his fist

Associated Press

Baker (right) and Aziz begin their talks in a Geneva conference room, where 6½ hours of discussion brought no agreement.

Photo #3: Baker-Aziz shaking hands

BEST COPY AVAILABLE

Photo #4: Mugshots

BEST COPY AVAILABLE

Journal photo by Richard Wood

DON HELLEY of Madison raises his fingers in the peace sign to indicate his solidarity with more than 800 people who packed the Assembly chambers Wednesday night in Madison to protest US involvement in the Persian Gulf. About 200 others supported US involvement.

Photo #5: Vietnam veteran

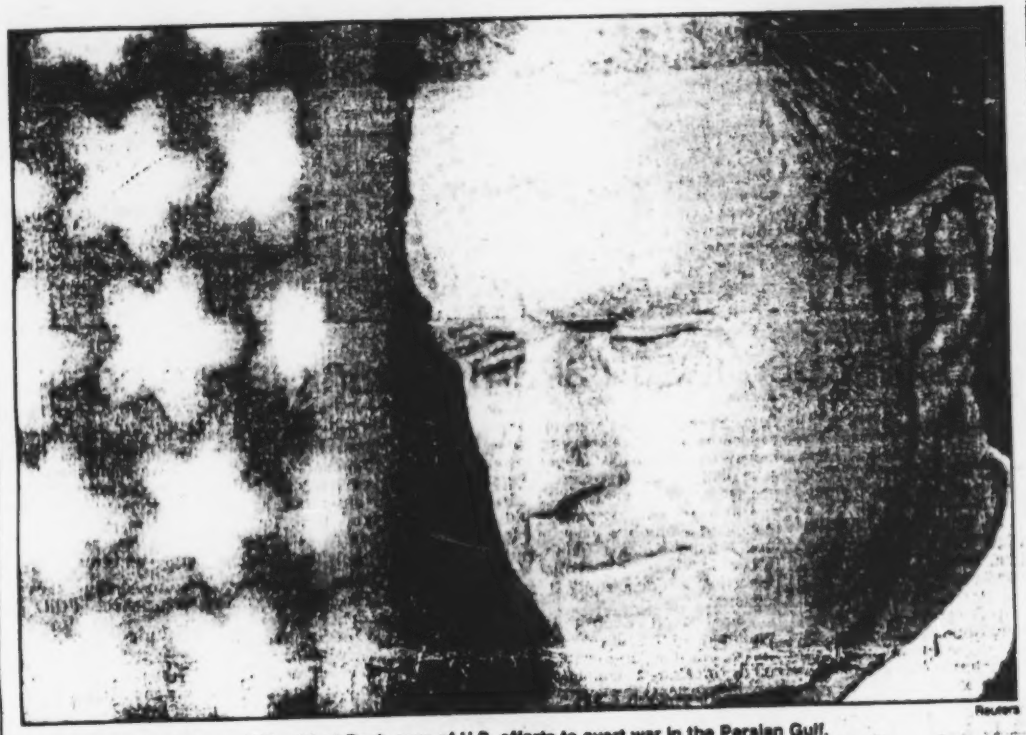
BEST COPY AVAILABLE

Sam Leone/Post-Dispatch

Darwin Callen, 3, on the shoulders of his father, Randy Callen, as they see off some of Randy Callen's fellow medical technicians Wednesday at Scott Air Force Base. Story on Page 13A.

Photo #6: Child with flag

BEST COPY AVAILABLE



"I am not going to give up," President Bush says of U.S. efforts to avert war in the Persian Gulf.

Photo #7: Somber President Bush

President Bush discusses the Geneva talks while his advisers and Cabinet members listen.

Photo #8: President Bush at lectern

BEST COPY AVAILABLE

TARA McPARLAND/Staff photographer

A C-5A, the largest aircraft in the non-communist world, landed Wednesday at Hancock Field to take Air Guard members to the Mideast.

Photo #9: U.S. Jet

BEST COPY AVAILABLE